**3.12 Multiple Angle Identities**

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_\_\_\_\_\_\_\_\_\_\_

**Find the exact value of each expression using double-angle identities.**

1.  2. 

3.  4. 

**Find the exact value of each expression using half-angle identities.**

5.  6. 

7.  8. 

**For each equation determine whether the positive or negative sign makes the equation correct. Do not use a calculator.**

9.  10. 

11.  12. 

**Use identities to simplify each expression. Do not use a calculator.**

13.  14. 

15.  16. 

**Prove that each equation is an identity.**

17.  18. 

19.  20. 

**In each case, find** .

21.  22. 

**Solve each problem.**

23. Find the exact value of given that .

24. Find the exact value of given that .

25. Find the exact value of  if .